Plant Pathology Circular No. 181
September 1977

Fla. Dept. Agr. & Consumer Serv.
Division of Plant Industry

HEART, BUTT, AND ROOT ROT OF REDBUD, CERCIS CAHADENSIS CAUSED BY GANODERMA CURTISII

S. A. Alfieri, Jr.

Redbud, Cercis canadensis L., is a spreading, deciduous, ornamental shrub or tree which can reach a height of 40 feet. Flowers occur in clusters and range in color from white, rosy-pink, to red. The genus Cercis has 7 species, 2 of which are native to North America and 5 native to southern Europe to Japan. In the United States its geographic range includes a region from New Jersey south, and west to Michigan, Missouri, and Texas (1).

Redbud is affected by a heart, butt, and root rot caused by the fungus Ganoderma curtisii (Berk.) Murr., a member of the family Polyporaceae. These are pore fungi commonly known as conchs or shelf fungi, which are ordinarily manifest on basal trunks (fig. 1) or stumps of trees, but less so on roots. Of the 100 or so species of the wood-decaying fungi, 75 per cent belong to this family (9). G. curtisii occurs only in the eastern half of the United States and only on hardwoods in the southeastern region of the U. S. (5).

The fungus (fig.2) appears as a perennial outgrowth on the bark of its host, having a lateral stipe (stem) with a pileus (cap) that is corky and kidney- or fan-shaped, and covered with a thin crust or varnish that may be entirely yellow, tinged with red or brown, becoming zonate or furrowed, smooth (no hairs or scales), measuring 1.8 - 4.7 inches wide (from the bark outward) by 1.8 - 7.8 inches broad (length) and from 0.3 - 1.8 inches thick (5,7,9). The spores (basidiospores) of this fungus are liberated from tubes in the cap and can number up to 30 billion a day (2).

The pore fungi are wood-inhabiting and as such, bring about the decay of wood, be it timber or lumber, after access occurs through some form of injury. Thus with living plants they may be considered wound parasites that bring about the decay of non-living heartwood and sapwood. Losses from wood-decaying fungi are estimated

Fig. 1. Butt and root rot of redbud tree Cercis canadensis caused by Ganoderma curtisii as shown at base of tree. Affected tree toppled to the ground as heart rot became extensive.

Fig. 2. Basidiocarps (conchs) of Ganoderma curtisii on basal trunk and root of redbud, Cercis canadensis.

Contribution No. 437, Bureau of Plant Pathology, P. 0. Box 1269, Gainesville, FL 32602.

to be 19 per cent of the hardwood stands in the eastern United States and 15 per cent of the merchantable coniferous timber in the West. The wood decay is brought about by the enzymatic action of the fungus on the cellulose and/or lignin, the principal components of wood cells (9). On the other hand, many of the wood-decaying fungi are beneficial to humanity by decomposing dead organic matter in the fields and forests, an important activity without which such refuse would soon cover the earth, and life would soon cease (8).

The host range of Ganoderma curtisii includes red maple, Acer rubrum L. (12); Albizia julibrissin Durazz. (4,6,10); Carya spp, (12); redbud, Cercis canadensis L. (3,4,10); Citrus sp. (4); honey locust, Gleditsia triacanthos L. (6,9,12); sweet gum, Liquidambar styraciflua L. (7,9,12); Magnolia spp. (6,9); apple, Malus sylvestris Mill. (12); saw cabbage palm, Acoelorrhaphe (Paurotis) wrightii (Griseb, & Wendl.) Wendl. ex Becc. (3); peach. Prunus persica (L.) Batsch. (3,12); white oak Quercus alba L.(12); scarlet oak, Q. coccinea Muensch. (12); laurel oak, Q. laurifolia Michx. (12); water oak, Q. nigra L. (3); pin oak, Q. palustris Muensch.(12); willow oak, Q. phellos L.(12); live oak, Q. virginiana Mill. (11,12); winged elm, Ulmus alata Michx. (12); and American elm, U. americana L. (12).

SYMPTOMS. Trees attacked by Ganoderma curtisjii often show wilting of the foliage followed by death (4). Affected redbuds exhibit a yellowing and sparseness of leaves, progressive dieback of limbs, particularly at the top of the tree, and finally defoliation. Trees which are affected at or near the soil line are weakened by the fungus decay and often fall to the ground (fig. l). Infection of hosts usually follows injuries to exposed roots and basal stems by mechanical equipment or other agents. The use of herbicides and fumigants as in fern nurseries utilizing oak trees as a canopy could predispose trees to attack by G. curtisii (11).

CONTROL. Protection of trees from attacks by G. curtisii is best achieved, where possible, by avoiding injuries to roots and basal stem areas of trees, by providing good growing conditions, and maintaining trees in a good state of vigor (10, 11).

References cited

1. Bailey, L. H. 1954. Manual of cultivated plants. MacMillan Co., Hew York. 1116 p.
2. Bessey, E. A. 1950. Morphology and taxonomy of the fungi. The Blakiston Co., Philadelphia. 791 p.
3. Bureau of Plant Pathology (Plant Disease Records), Div. Plant Ind., Fla. Dept. Agric. and Consumer Serv., Gainesville. (Unpublished)
4. Edgerton, C. W. 1974. A Ganoderma and its association with root rot of trees in Louisiana. J. Tenn. Acad. Sci. 29:178. (Abstr.)
5. Haddow, W. R. 1931. Studies in Ganoderma. J. Arnold Arboretum, Harvard Univ. 12(l):25-46.
6. Hepting, G. H. 1971. Diseases of forest and shade trees of the United States. USDA Forest Serv. Agric. Handbook 386. 658 p.
7. Murrill, W. A. 1908. Polyporaceae (Agaricales). North Amer. Flora 9 (Part 2): 73-131.
8. _____. 1951. Species of Florida Basidiomycetes. Univ. Fla. Agric. Exp. Sta. Tech. Bull. 478. 36 p.
9. Overholts, L. 0. 1953. The Polyporaceae of the United States, Alaska and Canada. Univ. Mich. Press, Ann Arbor, Mich. 467 p.
10. Pirone, P. P. 1970. Diseases and pests of ornamental plants. The Ronald Press Co., New York. 546 p.
11. Schmidt, R. A., and C. P. Seymour. 1972. Etiology of oak decline in Florida ferneries. Plant Dis. Reptr. 56(9):811-814.
12. U. S. Department of Agriculture. 1960. Index of plant diseases in the United States. Agric. Handbook No. 165. U. S. Gov't Printing Office, Wash. D. C. 531 p.